

## REMARKS

This is a full and timely response to the non-final Office Action of February 16, 2006.

Reexamination, reconsideration, and allowance of the application and all presently pending claims are respectfully requested.

Upon entry of this First Response, claims 1-28 are pending in this application. Claims 1, 3, and 9 are directly amended herein, and claim 28 has been newly added. Further, the specification has been amended to correct a minor typographical error. It is believed that the foregoing amendments add no new matter to the present application.

## Response to §112 Rejections

Claim 8 presently stands rejected under 35 U.S.C. §112, second paragraph, as allegedly failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. In rejecting claim 8, it is set forth in the Office Action that:

“Claim 8 recites that ‘the FEC manager is configured to output the characters of the first string from the first column and to then output the characters of the second string from the second column’ which is the same manner in which parent claim 7 recited that the data is stored in the buffer; however, applicant states in paragraph [0008] ‘Generally, embodiments of the present invention provide a forward error corrections (FEC) system and method for interleaving and transmitting FEC code words’, which amounts to an admission that the invention does not encompass the transmission of uninterleaved data as recited in claim 8.”

First of all, Applicants respectfully traverse the allegation that the quoted statement of paragraph [0008] constitutes an “admission” that the invention does not encompass the transmission of uninterleaved data. In this regard, Applicants note that the statement simply refers to “embodiments” and does not specify that all embodiments are characterized by the statement.

In addition, Applicants respectfully assert that there is nothing in claim 8 that is inconsistent with the statement of paragraph [0008]. In this regard, the application describes an exemplary embodiment in which characters are interleaved across multiple code words as the code words are being defined in a buffer. The characters are then retrieved from the buffer and transmitted according to the description of claim 8. Moreover, the *code words* are transmitted in an interleaved fashion even though the characters are transmitted in the same order that they are received by the FEC manager. See paragraphs [0050], [0051], and [0055] – [0057], noting that Figure 10 shows the characters being transmitted in the same order that they were originally received by the FEC manager. As can be seen by this example, there is nothing about claim 8 that is inconsistent with the quoted statement of paragraph [0008].

For at least the above reasons, Applicants respectfully assert that the 35 U.S.C. §112, second paragraph, rejection of claim 8 is improper and request that this rejection be withdrawn.

#### Response to §102 Rejections

A proper rejection of a claim under 35 U.S.C. §102 requires that a single prior art reference disclose each element of the claim. See, e.g., *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983).

## Claim 1

Claim 1 presently stands rejected under 35 U.S.C. §102 as allegedly being anticipated by *Kodama* (U.S. Patent Application Publication No. 2001/0056563 A1). Claim 1 reads as follows:

1. A forward error correction communication system, comprising:
  - a forward error correction (FEC) manager configured to receive, from a data stream, a first string of successive characters and a second string of successive characters, *the FEC manager further configured to define a plurality of FEC code words based on the data stream and, when defining the FEC code words, to interleave the characters of the first and second strings across the FEC code words such that each of the FEC code words comprises characters from both of the strings*, each of the FEC code words having a data portion and a checksum portion, the data portion comprising characters from the first and second strings and the checksum portion comprising redundant information about each character in the data portion; and
  - a transmitter configured to transmit the FEC code words to a remote receiver. (Emphasis added).

Applicants respectfully assert that *Kodama* fails to disclose at least the features of claim 1 highlighted hereinabove. Accordingly, the 35 U.S.C. §102 rejection of claim 1 is improper.

In this regard, when defining FEC code words from a data stream, conventional devices typically define the FEC code words consecutively. Thus, a first string of successive characters from the data stream is used to define a first code word. Then, a subsequent string of successive characters from the data stream is used to define the next word, and so forth. As an example, referring to FIG. 4 of the instant application, the first  $k$  characters received from a data stream are used to define the data characters of the FEC code word stored in “row 1,” and the next  $k$  characters (*i.e.*, characters “ $k+1$ ” through “ $2k$ ”) are used to define the data characters of the next FEC code word stored in “row 2.”

Moreover, in such an example, there are no two strings of “successive” characters from the data stream for which characters from **both** strings appear in *each* of a plurality of FEC code words. For example, if a first “string” ends as it is being used to complete a code word, then characters from a second “string” may be used to complete the code word. In this example, characters from both “strings” appear in this code word, referred to hereafter as the “current code word.” However, characters from the first “string” do not appear in the next code word (*i.e.*, the code word following the current code word), and characters from the second “string” do not appear in the previous code word (*i.e.*, the code word preceding the current code word).

If, on the other hand, a first “string” does not end as it is being used to complete the current code word (*i.e.*, the data portion of the current code word is completed before the first “string” ends), then characters from the first “string” may be used to form the next code word. In such an example, it is possible that characters from a second “string” could be used to form this same next code word. However, the characters from such a second “string” would not have been used to form the current code word. Accordingly, there would be no two “strings” of successive characters from the data stream that would both appear in each of the same two words.

In at least one embodiment described by the present application, a plurality of FEC code words that are to be interleaved together during transmission are defined such that the formation of each of the plurality of code words is initiated before formation of any of the code words is completed. For example, the first character from a data stream may be used to define the first character of a first FEC code word. Rather, than using the next character from the data stream to define another character of the first FEC code word, the next character from the data stream is used to define a character of another FEC code word that is to be interleaved with the first FEC code

word. See paragraphs [0050] – [0053]. A later received string is then used to define other characters of the same two code words as each buffer column is completed on a row-by-row basis in this example. Thus, unlike the conventional techniques described above, characters from *each* of two strings of successive characters from the data stream appear in *each* of the plurality of FEC code words. Note that other techniques may be used to achieve the foregoing result.

Moreover, *Kodama* does not appear to disclose a method of forming FEC code words from a data stream such that characters from each of two different strings of successive characters from the data stream appear in each of a plurality of FEC code words. In this regard, *Kodama* appears to show a formation of a code word (see Figure 9), but *Kodama* does not appear to describe, in detail, the manner in which the code word is formed from a data stream. Further, it is not inherent that such a code word is formed in a manner consistent with the features recited in claim 1.

Nevertheless, it is alleged in the Office Action that the alleged “first string” constitutes “characters”  $D_0$  to  $D_{15}$  and that the alleged “second string” constitutes “characters”  $D_{16}$  to  $D_{31}$ . Noting that each “D” value in *Kodama* appears to constitute a single bit (see Figure 9), Figure 10 shows the bits from the two alleged “strings” as being transmitted in an interleaved fashion such that the bits from the alleged “first string” are separated by at least bits from the alleged “second string.” However, there is nothing to indicate that bits from the alleged “first string” are used to define at least two FEC code words and that bits from the alleged “second string” are also used to define these *same* two FEC code words. In fact, it appears that all bits  $D_0$  to  $D_{207}$  are used to define the data portion of a single code word and bits  $D_{208}$  to  $D_{223}$  are used to define the checksum portion of this code word. See Figure 9. Notably, Figure 10 appears to merely show the code word of Figure 9 transmitted in an interleaved fashion rather than a non-interleaved fashion. See paragraphs

50 and 51. Regardless of how the code word is transmitted, there is nothing to indicate that it is defined, along with at least one other code word, in the manner described by claim 1. In particular, *Kodama* fails to disclose an “FEC manager further configured to define a plurality of FEC code words based on the data stream and, when defining the FEC code words *such that each of the FEC code words comprises characters from both of the strings*,” as described by claim 1. (Emphasis added).

For at least the above reasons, Applicants respectfully assert that the cited art fails to disclose each feature of pending claim 1. Accordingly, the 35 U.S.C. §102 rejection of claim 1 should be withdrawn.

#### **Claims 2 and 4-8**

Claims 2 and 4-8 presently stand rejected in the Office Action under 35 U.S.C. §102 as allegedly being anticipated by *Kodama*. Applicants submit that the pending dependent claims 2 and 4-8 contain all features of their respective independent claim 1. Since claim 1 should be allowed, as argued hereinabove, pending dependent claims 2 and 4-8 should be allowed as a matter of law for at least this reason. *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988).

### **Claim 19**

Claim 19 presently stands rejected under 35 U.S.C. §102 as allegedly being anticipated by *Kodama*. Claim 19 reads as follows:

19. A forward error correction (FEC) method, comprising the steps of:  
receiving a data stream, the data stream comprising a first string of  
successive characters and a second string of successive characters;  
*defining a plurality of FEC code words based on the data stream in an  
interleaved fashion such that each of the FEC code words comprises characters  
from both of the strings; and*  
transmitting the FEC code words to a remote receiver. (Emphasis added).

For at least reasons similar to those set forth above in the arguments for allowance of claim 1, Applicants respectfully assert that the cited art fails to disclose at least the features of claim 19 highlighted hereinabove. Accordingly, the 35 U.S.C. §102 rejection of claim 19 is improper and should be withdrawn.

### **Claims 20-22 and 28**

Claims 20-22 presently stand rejected in the Office Action under 35 U.S.C. §102 as allegedly being anticipated by *Kodama*. In addition, claim 28 has been newly added via the amendments set forth herein. Applicants submit that the pending dependent claims 20-22 and 28 contain all features of their respective independent claim 19. Since claim 19 should be allowed, as argued hereinabove, pending dependent claims 20-22 and 28 should be allowed as a matter of law for at least this reason. *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988).

**Allowable Subject Matter**

Claims 10-18 and 23-27 are allowed, and claims 3 and 9 have been indicated as allowable by the outstanding Office Action if such claims are rewritten to include the limitations of their respective base claims. Accordingly, pending claims 3 and 9 have been amended herein to include the features of their respective base claims, and Applicants respectfully request that the objections to these claims be withdrawn.

**CONCLUSION**

Applicants respectfully request that all outstanding objections and rejections be withdrawn and that this application and all presently pending claims be allowed to issue. If the Examiner has any questions or comments regarding Applicants' response, the Examiner is encouraged to telephone Applicants' undersigned counsel.

Respectfully submitted,

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